CMHC SCHL

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Canada

RESIDENTIAL VENTILATION

INDUSTRY SURVEY

August 1988

(Revised December 1990)

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RESIDENTIAL VENTILATION INDUSTRY SURVEY

August, 1988

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Canada Mortgage and Housing Corporation, the Federal Government's housing agency is responsible for administering the National Housing Act

This legislation is designed to aid in the improvement of housing and living in Canada. As a result, the Corporation has interests in all aspects of housing and urban growth and development.

Under Part IX of this act, the Government of Canada provides funds to CMHC to conduct research into social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research. CMHC therefore has the statutory responsibility to make widely available, information which may be useful in the improvement of housing and living conditions.

This publication is one of many items of information published by CMHC with the assistance of federal funds.

DISCLAIMER

This document was prepared by Bowser Technical Inc. for Canada Mortgage and Housing Corporation under Part IX of the National Housing Act. The analysis, interpretations and recommendations are those of the consultant and do not necessarily reflect the views of Canada Mortgage and Housing Corporation or those divisions of the corporation that assisted in the study and its publication.

INTRODUCTION

This document reports on the result of an opinion survey of the residential ventilation industry which was conducted in August of 1988.

The survey was undertaken in order to provide information which will assist in assessing the potential effect of the introduction of upgraded ventilation requirements in residential building codes.

The survey was conducted among:

Group	Replies	Return Rate
Building Officials	243	34%
Ventilation Equipment Manufacturers/Suppliers	12	40%
Ventilation Installers	28	57%

The text of this document and the accompanying figures present summaries of the responses, emphasising topical issues with regard to ventilation standards.

For more detailed study, the reader is referred to the appendices which contain question by question response statistics.

1.0 Building Official Survey

Over 600 questionnaires were sent to building officials in municipalities with populations greater than 5000 and to regional CMHC inspectors across Canada.

The questions solicited responses regarding the kind of housing that is being built, what heating systems dominate, and what ventilation strategies are being used. Information concerning which exhaust appliances are being installed, how often airtightness details are being used and the impact of current impact ventilation regulation changes was solicited.

Analysis of the results was carried out according to the following breakdown:

		Number of Returns	Return Rate
CMHC Inspectors		26	77%
Municipal Building Officials	*National*	217	34%
	British Columbia	24%	*of national*
	Alberta	11%	
	Sask./Manitoba	8%	
	Ontario	25%	
	Quebec	20%	
	Maritimes	11%	
	Yukon/N.W.T	1%	

Respondents to the survey were directly involved with approximately 48,000 new residential housing units in the year preceding the survey.

1.1 Primary Heating Systems

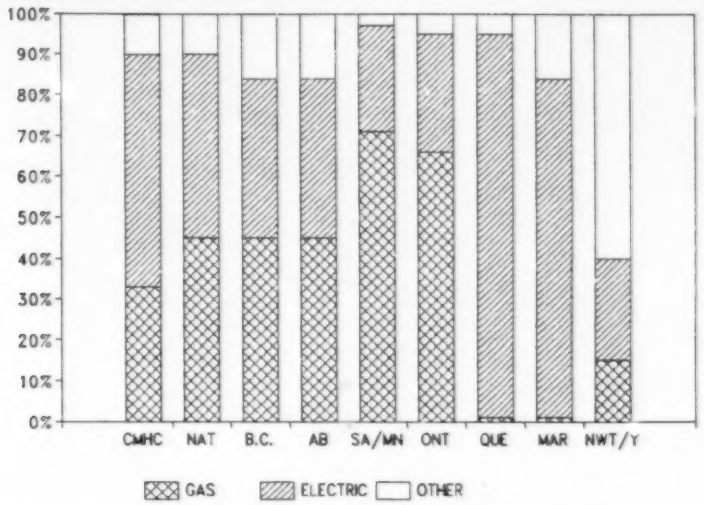

Figure 1; **New Home Primary Heating System Fuel Type**

1.2 Heating Distribution Type

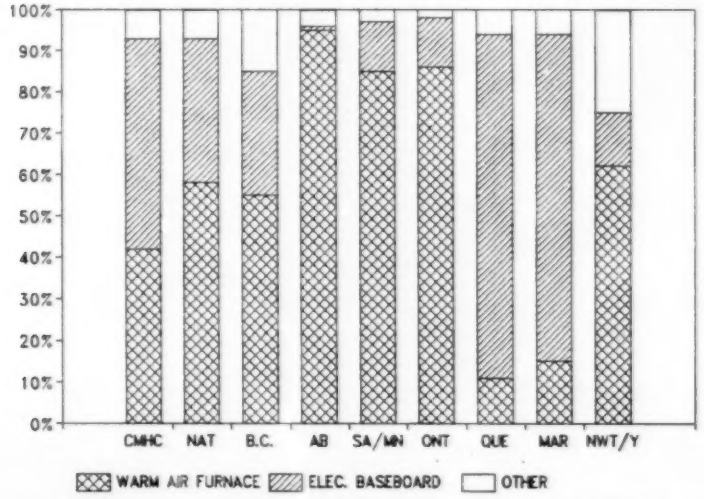

Figure 2; **New Home Heating System Distribution Type**

There are strong regional variations in heating system types; Ontario and the Prairies are predominantly forced-air gas; Quebec and the Maritimes are predominantly electric baseboard.

1.3 Fireplaces

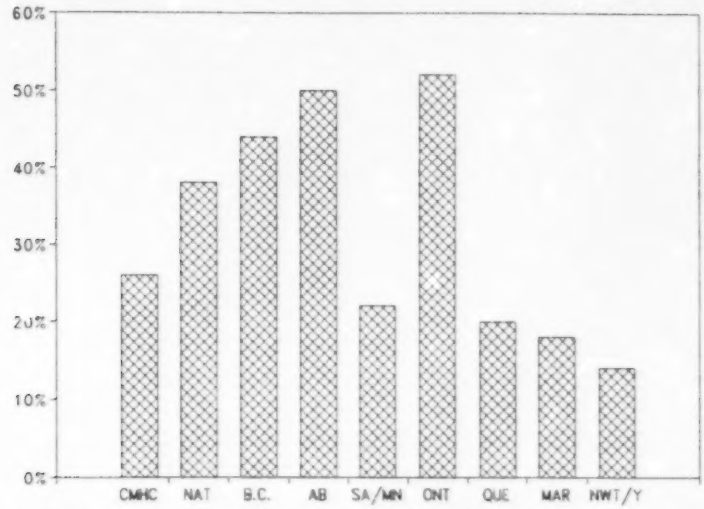

Figure 3; **New Homes with Fireplaces**

The presence of fireplaces as a new-home feature is well established.

1.4 Exhaust Appliances

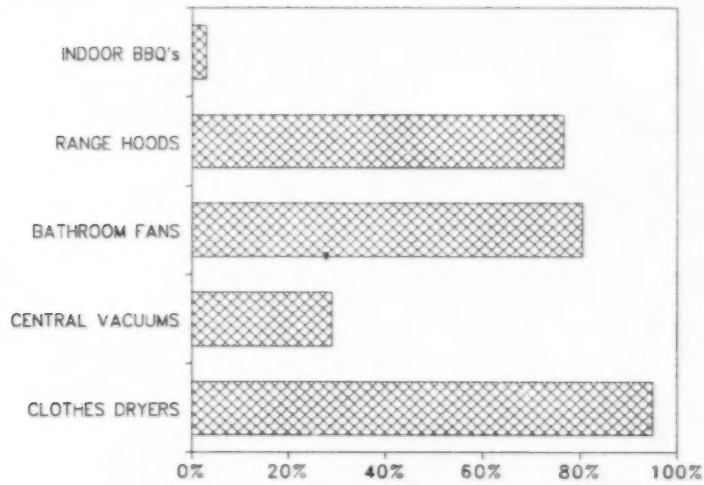

Figure 4; **New Home Exhaust Appliances**

Clothes dryers are considerered to be installed in virtually all new homes.

Range hoods and bathroom fans are considered to be installed in most new homes.

1.5 Make-up Air

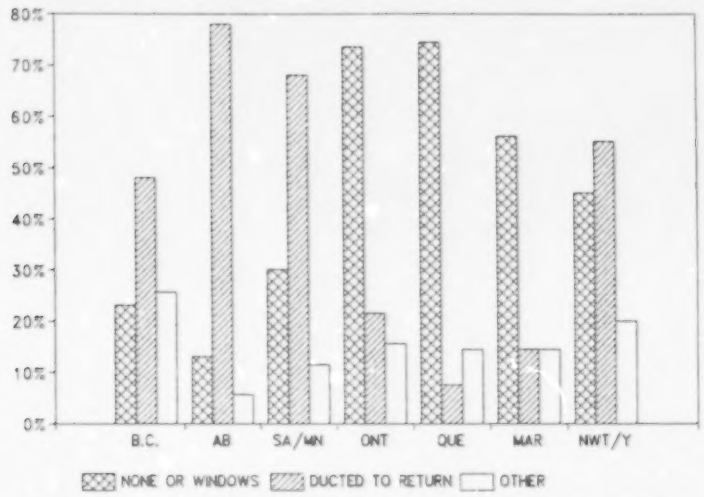

Figure 5; **Methods of Providing Make-up air for Exhaust Appliances**

With respect to providing make-up air for the operation of exhaust appliances, there appears to be significant differences in practice between the regions.

It is noteworthy that in Ontario, a province which has a significant combustion heating fraction, little attention is paid to providing make-up air.

1.6 Ventilation Systems

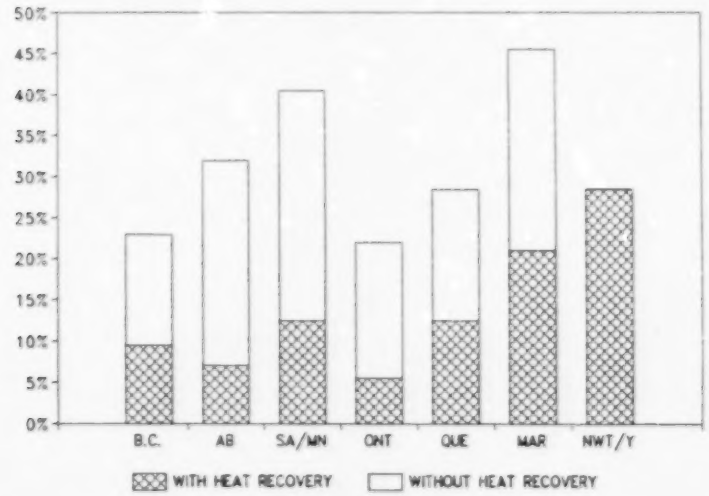

Figure 6; **Central Ventilation Systems**

Central ventilation systems are installed in a large portion of new homes. Heat recovery type central ventilation systems are particularly popular in the maritimes and in northern areas.

1.7 Airtightness

More than 50% of respondents (45% of CMHC respondents) said that they frequently encountered gasketing of sill plates, caulking of poly air/vapour barriers and sealing of all openings.

35% to 50% of respondents (23% to 45% of CMHC respondents) said that they frequently encounter the use of an exterior air barrier, the sealing of window frames to the rough opening and the airtightening of header areas.

1.8 Moisture Problems

The respondents felt that 21% (30.5% CMHC) of the housing stock suffers from moisture problems.

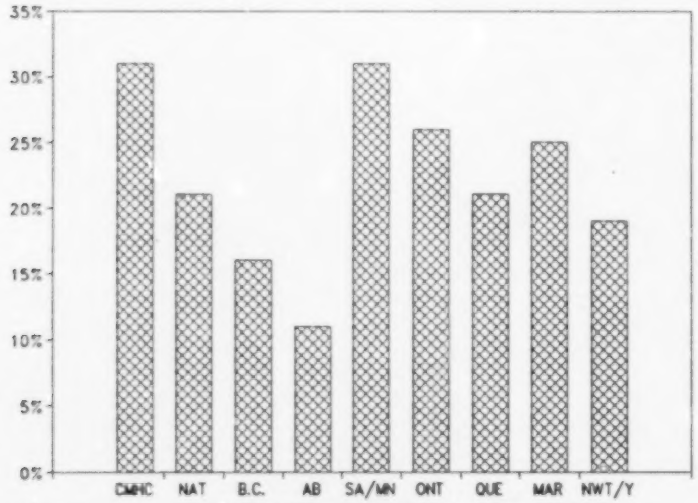

Figure 7; **Percent of Houses Suffering from Moisture Problems**

Of those who felt they could state an opinion, 70% (80% CMHC) reported that new ventilation requirements reduced the incidence of moisture problems.

There is no apparent relationship between the incidence of moisture problems and the type of fuel or heating system.

1.9 Impact of Changes in Ventilation Requirements

Only 39% of building officials (50% of CMHC) felt that there had been any recent change in ventilation requirements.

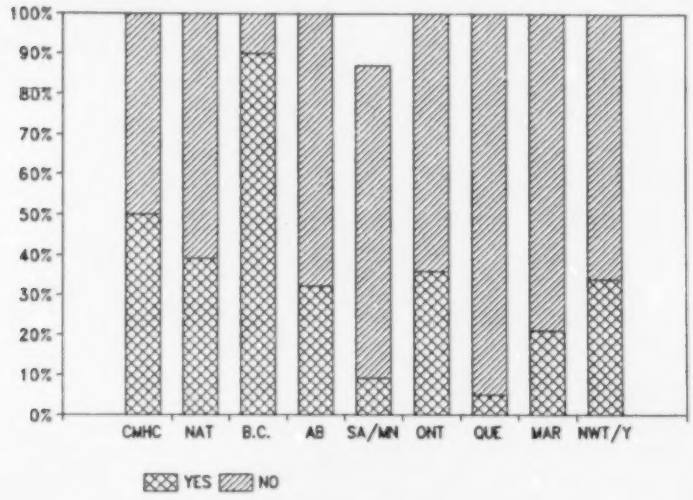

Figure 8; **Recent Changes in Ventilation Requirements**

Of those building officials who felt that there had been recent changes; 55% (46% of CMHC) reported the impact as being small while 4% (0% of CMHC) felt the impact was major.

In B.C., where significant ventilation requirement changes were implemented recently, 52% reported the impact as being small and no respondent considered it major.

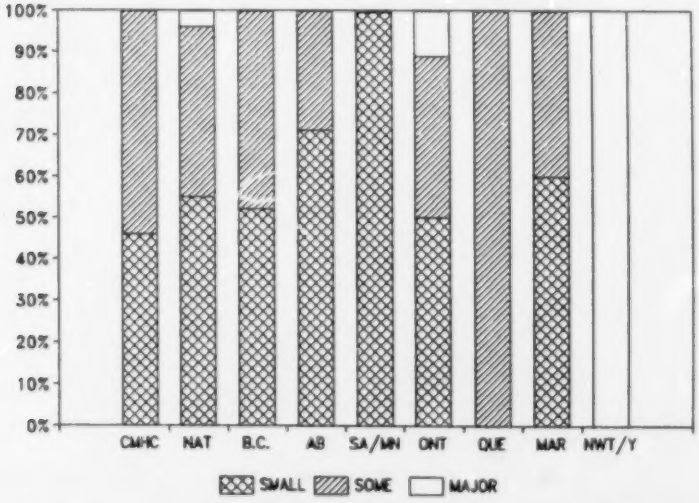

Figure 9; **Impact of Recent Requirement Changes**

2.0 Equipment Suppliers Survey

30 manufacturers/suppliers of ventilation equipment were sent questionnaires which requested comments as to how upgraded ventilation requirements might affect their operations.

This list was supplied by the Heating Refrigeration & Air-conditioning Institute, (HRAI) and was judged to represent most of the manufacturers or primary importers of residential ventilation equipment in Canada.

Twelve suppliers (40% return rate) responded to the questionnaire.

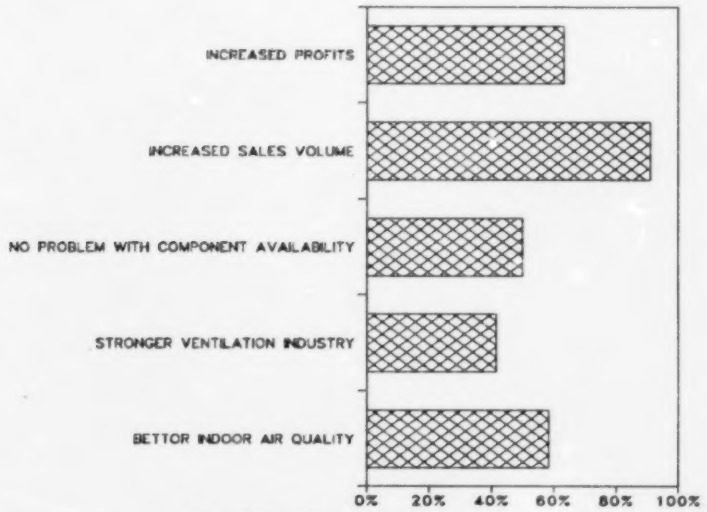

Figure 10; **Suppliers Impact Assessment**

A majority of suppliers anticipated increased sales and profits.

50% of suppliers anticipated little or no problem would be encountered in obtaining an increased volume of specialized components which would be required to meet the predicted increase in sales.

3.0 Ventilation Installers Survey

Questionnaires were sent to 49 representative mechanical contracting firms across the country.

These 49 were selected from a larger list of approximately 350 individuals who had followed a residential ventilation installation and design course with the Heating Refrigeration & Air-conditioning Institute (HRAI).

In selecting the mail-out group, an attempt was made to obtain regional balance, and to solicit those firms which were active in residential ventilation work.

28 installers answered the survey (57% return rate).

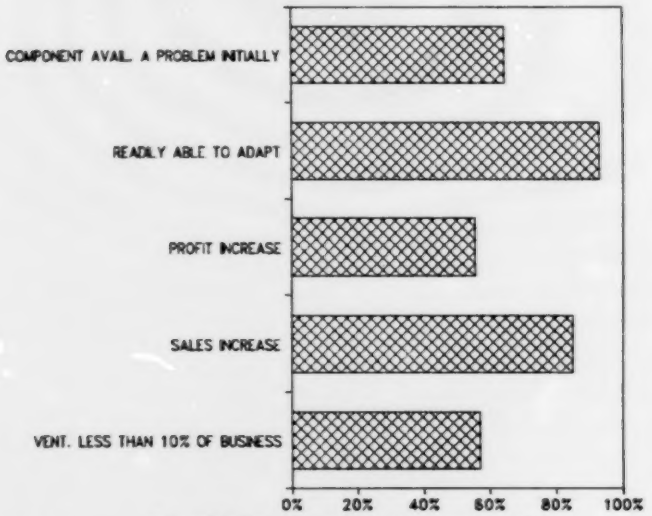

Figure 11; **Installer's Impact Assessment**

Almost all installers (93%) felt that their company would readily be able to adapt if an upgraded standard is adopted.

APPENDICES

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[Canada Mortgage & Housing Corp Letter-head]

Dear Sir or Madam,

As you may be aware, ventilation and indoor air quality are currently major issues in low rise housing, requiring input from all parties affected. Your perspective of actual ventilation practices is highly valuable to us.

At present, ventilation requirements and practices vary significantly across the country. Besides local guidelines, the National Building Code (NBC), where applicable, requires 0.5 air changes/hour of mechanical ventilation and a CSA Standard is expected to be available soon which will define residential ventilation requirements in some detail. Difficulties exist with the integration of systems, the effect of increasing airtightness and the quantifying of improved air quality.

Since mandating mechanical ventilation is a controversial issue, the firm Allen Associates is conducting a study on behalf of CMHC to assess the impact of adopting the draft CSA ventilation standard CAN/CSA-F326-M: Requirements for Residential Ventilation. An important aspect of this study is to determine what ventilation practices are presently being pursued in order to establish a baseline against which any future impact can be measured. As you are the major link between regulatory bodies and construction practices, your assistance in answering the attached questionnaire will be invaluable, not only in regards to information you can provide to us, but also in helping us identify your information requirements.

Please be assured that all responses will remain strictly confidential. If you are interested in the results of the study, a summary of the findings will gladly be forwarded to you, once it becomes available.

If you feel there is a more appropriate person in your offices to answer this questionnaire, please pass it on.

Thank you very much for your co-operation.

Sincerely yours,

Jacques Rousseau
Project Manager
Project Information Division

This questionnaire should be completed by the person within your municipality who is responsible for building and/or mechanical inspections.

Building Official Replies

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Response Rate	72%	34%	53%	35%	62%	28%	29%	48%	17%
Sample Size	26	217	51	24	18	53	44	24	3

	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y	Total
CMHC Reply Distribution	12%	8%	8%	23%	31%	20%	0%	102%
Municipal Reply Dist.	24%	11%	9%	25%	21%	11%	2%	103%

1. What is your position in the municipality?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Building Official	0%	63%	73%	50%	78%	87%	37%	38%	100%
Municipal Engineer	0%	2%	0%	5%	6%	0%	3%	4%	0%
Municipal Inspector	0%	28%	20%	37%	17%	12%	50%	50%	0%
CMHC Compliance Insp	43%	1%	0%	0%	0%	0%	0%	4%	0%
Municipal Clerk	0%	1%	0%	5%	0%	0%	3%	0%	0%
Other	58%	6%	8%	14%	0%	2%	9%	4%	0%
Total	100%	100%	100%	109%	100%	100%	101%	100%	100%

2. Province or Territory?

N/A

3. For approximately how many new (i.e. over the previous 12 months) low rise-detached, semi-detached or row - housing units were you responsible?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Average	449	310	229	196	54	541	368	187	123
Total	9878	48980	10305	4312	810	27591	10672	4301	369

4. How many new housing starts in the following categories did your municipality have last year?

		CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Detached	avg	1925	211	170	164	70	415	133	151	181
	ttl	46200	44099	8670	3936	1190	20750	5453	3473	543
Semi-Detached	avg	191	20	15	4	5	41	13	28	3
	ttl	4584	4180	765	96	85	2050	533	644	9
Row-housing	avg	326	33	37	11	5	78	17	6	1
	ttl	7824	6897	1887	264	85	3900	697	138	3
Total Starts		58608	55176	11322	4296	1360	26700	6683	4255	555

5. How many registered R-2000 houses do you estimate have been built in your municipality?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Avg reg. R2000's built	40	11	9	18	4	9	6	9	188
Ttl reg. R2000's built	920	2123	423	396	52	450	216	207	376
% R2000 of total starts	2%	4%	4%	9%	4%	2%	3%	5%	68%
% R2000 of single starts	2%	5%	5%	10%	4%	2%	4%	6%	69%

6. What are the present ventilation requirements?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
1985 Nat. Building Code	73%	42%	28%	25%	56%	0%	78%	96%	100%
1980 Nat. Building Code	20%	3%	0%	0%	0%	0%	9%	4%	0%
Provincial Building Code	8%	52%	71%	71%	39%	100%	0%	0%	0%
Municipal Building Code	0%	0%	0%	0%	0%	0%	0%	0%	0%
None	0%	4%	2%	4%	6%	0%	14%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

8. **Have there been recent changes in ventilation requirements?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
YES	50%	39%	90%	32%	9%	36%	5%	21%	34%
NO	50%	61%	10%	68%	78%	65%	95%	79%	67%

If the above answer is YES, what would you say the impact on new housing has been?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Negligible	31%	6%	2%	14%	25%	11%	0%	0%	0%
Slight	16%	50%	50%	57%	75%	39%	0%	60%	0%
Some	23%	24%	25%	14%	0%	28%	50%	20%	0%
Significant	31%	18%	23%	14%	0%	11%	50%	20%	0%
Major	0%	4%	0%	0%	0%	11%	0%	0%	100%
Total	101%	100%	100%	100%	100%	100%	100%	100%	100%

9. **How do you obtain guidelines on ventilation requirements and interpretation?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Regulatory Body	69%	70%	74%	92%	53%	78%	42%	61%	100%
Seminars	54%	48%	64%	46%	41%	47%	55%	65%	100%
Installation Manuals	23%	20%	22%	17%	6%	25%	7%	29%	67%
Manufacturers Lit.	43%	28%	30%	29%	12%	30%	16%	35%	67%
Own Interpretation	27%	29%	8%	13%	47%	23%	42%	35%	0%
Other	35%	13%	14%	13%	6%	15%	7%	18%	0%

10. **What is the PRIMARY heating system being installed in new houses on a proportional basis?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Electric Baseboard	51%	36%	31%	1%	12%	12%	84%	79%	14%
Electric Furnace	7%	8%	8%	1%	12%	12%	6%	3%	12%
Gas Furn. (Nat. Draft)	26%	27%	36%	66%	42%	28%	0%	1%	7%
Gas Furn. (Mid or high eff)	7%	18%	9%	32%	31%	38%	1%	1%	9%
Sum of Gas Furnace	33%	45%	45%	98%	73%	66%	1%	1%	15%
Oil Furnace	2%	3%	1%	1%	0%	4%	0%	10%	44%
Wood Stove or Furnace	3%	4%	8%	1%	3%	2%	1%	5%	28%
Heat Pump	0%	3%	2%	2%	0%	5%	4%	2%	3%
Other	5%	4%	7%	4%	0%	1%	6%	2%	0%
Sum of WS/F, HP, Other	8%	10%	17%	6%	3%	7%	10%	8%	28%
Sum of WS/F, HP, OF, Other	9%	13%	18%	7%	3%	11%	10%	18%	72%
Total	100%	101%	100%	105%	100%	100%	100%	101%	112%

11. **What is the proportion of new houses with the following wood burning equipment?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Fireplace	26%	38%	44%	50%	22%	52%	20%	18%	14%
Woodstove	18%	22%	39%	15%	9%	15%	15%	27%	52%
Wood Furnace	8%	5%	9%	1%	4%	2%	3%	8%	10%

12. **What proportion of new houses have the following strategies for introducing air to oil or gas combustion furnaces and wood burning equipment?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
No Provisions	53%	31%	9%	0%	20%	42%	65%	57%	24%
Ducted to Mech. Room	30%	48%	57%	96%	70%	28%	22%	30%	77%
Other	12%	18%	33%	3%	9%	25%	0%	12%	34%
Total	94%	96%	99%	99%	98%	95%	86%	98%	134%

13. **Houses typically have a number of appliances that exhaust air to outside. Please estimate what proportion of new houses include the following items.**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Bathroom Fan	77%	84%	96%	96%	93%	80%	57%	94%	100%
Kitchen Range Hood	70%	83%	87%	82%	73%	77%	95%	78%	59%
Clothes Dryer	95%	94%	95%	97%	95%	93%	96%	86%	97%
Central Vac	13%	29%	31%	34%	23%	30%	23%	41%	7%
Vented Indoor BBQ	3%	3%	2%	4%	1%	1%	6%	5%	4%
Other	5%	3%	4%	0%	4%	3%	0%	8%	17%

14. **What proportion of new houses provide make-up air for exhaust equipment by the following means?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
None or Windows or Doors	74%	48%	23%	13%	30%	74%	75%	56%	45%
Duct to Ret. of Forced Air	22%	37%	48%	78%	68%	22%	8%	14%	55%
Ducting to rooms	2%	10%	18%	3%	7%	8%	4%	13%	17%
Fan Controlled from Furnace	6%	7%	8%	3%	5%	8%	11%	2%	4%
Total	103%	100%	97%	97%	110%	111%	97%	85%	120%

15. **What proportion of new houses use the following ventilation strategies?**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Bathroom/Kitchen Fans	79%	81%	83%	87%	84%	84%	80%	70%	72%
Central Vent. without HR	20%	19%	14%	25%	28%	17%	16%	25%	0%
Central Vent. with HR	8%	11%	10%	7%	13%	6%	13%	21%	28%
Other	4%	2%	2%	8%	0%	2%	0%	3%	0%
Total	110%	112%	107%	127%	125%	107%	108%	118%	100%

16. **Airtightening of the exterior envelope involves achieving a continuous air barrier. This includes sealing/caulking at joints, window perimeters, openings, etc. Indicate how frequently the following practices are being employed:**

a) **Tyvek or Glasclad applied to the exterior and conscientiously taped;**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	43%	37%	11%	13%	0%	37%	82%	50%	100%
Sometimes	57%	51%	67%	56%	63%	57%	18%	50%	0%
Never	0%	13%	23%	31%	36%	6%	0%	0%	0%
Total	100%	101%	101%	100%	98%	100%	100%	100%	100%

b) **Sill Plate gasket used;**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	50%	53%	10%	22%	7%	72%	32%	67%	34%
Sometimes	46%	38%	27%	56%	57%	28%	50%	28%	34%
Never	4%	10%	4%	13%	36%	0%	19%	5%	33%
Total	100%	100%	40%	91%	100%	100%	100%	100%	100%

c) **Poly vapour barrier caulked at perimeter;**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	46%	55%	59%	87%	94%	35%	43%	67%	100%
Sometimes	43%	38%	39%	13%	0%	53%	41%	28%	0%
Never	12%	8%	2%	0%	6%	12%	8%	5%	0%
Total	100%	100%	100%	100%	100%	100%	92%	100%	100%

d) **Drywall with perimeter gaskets (ADA);**

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	5%	11%	13%	0%	17%	9%	15%	10%	0%
Sometimes	18%	24%	19%	53%	0%	21%	37%	14%	33%
Never	8%	66%	68%	47%	84%	72%	55%	76%	67%
Total	30%	100%	100%	100%	100%	101%	106%	100%	100%

16. cont'd

e) All openings sealed (penetrations, plumbing stack, service entry, etc.);

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	50%	60%	68%	74%	82%	54%	52%	37%	100%
Sometimes	50%	37%	31%	26%	19%	43%	41%	55%	0%
Never	0%	8%	2%	0%	0%	6%	8%	9%	0%
Total	100%	104%	100%	100%	100%	103%	100%	100%	100%

f) Windows wrapped with poly and caulked, or foamed;

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	23%	44%	28%	48%	38%	64%	53%	24%	67%
Sometimes	73%	45%	59%	44%	56%	27%	35%	72%	33%
Never	4%	4%	17%	9%	7%	35%	13%	5%	0%
Total	100%	93%	103%	100%	100%	125%	100%	100%	100%

g) Headers caulked, wrapped or gasketed;

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
Frequently	23%	36%	28%	65%	65%	39%	21%	20%	100%
Sometimes	62%	46%	43%	31%	28%	46%	53%	65%	0%
Never	16%	19%	28%	5%	7%	16%	23%	15%	0%
Total	100%	100%	100%	100%	100%	101%	96%	100%	100%

17. **What percentage of your housing stock would you estimate suffers from excess humidity and resulting problems?**

CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
31%	21%	16%	11%	31%	26%	21%	25%	19%

If applicable, has there been a reduction in the incidences of moisture problems since the introduction of new ventilation requirements?

	CMHC	NAT	BC	ALTA	SA/MAN	ONT	QUE	MAR	NWT/Y
YES	45%	27%	16%	17%	28%	29%	29%	49%	34%
NO	12%	12%	10%	21%	0%	13%	13%	9%	33%
DONT KNOW	43%	61%	74%	62%	72%	58%	58%	42%	33%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

[Canada Mortgage & Housing Corp Letter-head]

Dear Sir or Madam,

As you may be aware, ventilation and indoor air quality are currently major issues in low rise housing, requiring input from all sectors of the building industry. The firm Allen Associates is conducting a study on behalf of CMHC to assess the impact of adopting the CSA Standards F326.1 Requirements for Residential Mechanical Ventilation and F326.2 Residential Mechanical Ventilation System Installation Requirements in building codes across Canada. As a supplier of ventilation components and systems, your input regarding the possible implications of such a code modification is extremely valuable to our study. With new housing starts at about 200,000 per year a new ventilation requirement could open up a sizable market for more sophisticated ventilation systems.

Essentially the ventilation standards require the installation of continuous mechanical ventilation. Actual installed equipment will depend on the house and ventilation system design, but typical equipment options can be suggested. Some example strategies are as follows:

EXAMPLE	SUPPLY	EXHAUST
A	Make-up air delivered to occupied zone via passive air intake(s).	Continuous central exhaust system ducted from kitchen and bathrooms.
B	Make-up air ducted to return plenum of forced air system.	Individual exhaust fans in kitchen and bathrooms, either intermittant or continuous use.
C	Powered make-up supply fan with ductwork to each room. Fresh air may require preheating, e.g. HRV or duct heater.	Continuous central exhaust system ducted from kitchen and bathrooms.

Heat recovery can be provided by heat recovery ventilators for balanced ventilation (i.e. continuous mechanical supply and exhaust) and by exhaust air heat pumps for continuous exhaust-only mechanical ventilation.

Attached is a brief questionnaire which will enable us to get an idea of your company's activities in the area of residential ventilation and obtain feedback on the proposed ventilation requirement.

..... 2

Please be assured that all information will remain strictly confidential. A summary will forwarded to you, once it becomes available.

If you feel there is a person in your company that is more appropriate for filling out the questionnaire, please pass it on. Once completed please return it to the address indicated at the end of the questionnaire or use the enclosed envelope.

Should you have any questions or if you require clarification to complete the questionnaire, do not hesitate to contact Mario Kani of Allen Associates at (416) 962-6193.

Thank you very much for your co-operation.

Sincerely yours,

Jacques Rousseau
Project Manager
Project Implementation Division

Return Rate: 40%

1. **Number of responses by region:**

West:	3
Ontario:	5
Quebec:	1
Atlantic:	2
U.S.A.	1
Total	12

2. **Which of the following residential ventilation products do you presently supply?**

SAMPLE SIZE: 12

16.5%	Standard kitchen and bathroom exhaust fans
16.5%	Range hood exhausters
33.5%	Quiet, continuous-duty exhaust fans
16.5%	Central exhaust systems (ducted from kitchen and washrooms to single exhaust fan)
33.5%	Central ventilation systems (powered supply and exhaust)
0 %	Make-up air ducts
8.5%	Make-up air fans
75 %	Heat recovery ventilators
25 %	Exhaust air heat pumps
33.5%	Registers and diffusers
25 %	Ductwork and accessories
8.5%	Other: air flow measurement equipment

3. **What impact will mandating defined ventilation requirements for new houses have on your company?**

SAMPLE SIZE: 11

9 %	None
91 %	Increased sales volume
63.5%	Increased profits
0 %	Decreased sales volume
9 %	Decreased profits

4. **What problems do you anticipate with availability of components if the standard is adopted nationally?**

SAMPLE SIZE: 12

50 %	Few or no problems
41.7%	Shortage of components initially
8.3%	Flood of unproven products in market place and dubious quality control of initial installations

5. **What benefits do you perceive if the standard is adopted nationally?**

SAMPLE SIZE: 11

58.5%	Better indoor air quality and health in general
41.5%	Stronger industry, more competition,better industry education
33.5%	Increased life and durability of house components
33.5%	Increased sales volume
16.5%	Reduced energy consumption due to ventilation heat recovery

5. cont'd

8.5% Higher consumer/builder awareness

8.5% Decreased cost of systems

8.3% No benefit

6. **What will the impact be on your ventilation manufacturing lines and/or inventory?**

SAMPLE SIZE: 11

63.5% Expanded manufacturing lines/inventory

27.5% Positive impact

9 % Added cost for retooling

9 % Uncertain about impact

9 % No impact

7. **Would you anticipate bringing new products to the marketplace as a result of the new ventilation standard?**

58.5% Yes
33.5% No
8.3% Maybe

[Canada Mortgage & Housing Corp Letter-head]

Dear Sir or Madam,

As you may be aware, ventilation and indoor air quality are currently major issues in low rise housing, requiring input from all sectors of the building industry. The firm Allen Associates is conducting a study on behalf of CMHC to assess the impact of adopting the CSA Standards F326.1 Requirements for Residential Mechanical Ventilation and F326.2 Residential Mechanical Ventilation System Installation Requirements in building codes across Canada. As an installer of ventilation components and systems, your input regarding the possible implications of such a code modification is extremely valuable to our study. It is likely that the new ventilation requirement could open up a sizable market for more sophisticated ventilation systems.

Essentially the ventilation standards require the installation of continuous mechanical ventilation. Actual installed equipment will depend on the house and ventilation system design, but typical equipment options can be suggested. Some example strategies are as follows:

EXAMPLE	SUPPLY	EXHAUST
A	Make-up air delivered to occupied zone via passive air intake(s).	Continuous central exhaust system ducted from kitchen and bathrooms.
B	Make-up air ducted to return plenum of forced air system.	Individual exhaust fans in kitchen and bathrooms, either intermittant or continuous use.
C	Powered make-up supply fan with ductwork to each room. Fresh air may require preheating, e.g. HRV or duct heater.	Continuous central exhaust system ducted from kitchen and bathrooms.

Heat recovery can be provided by heat recovery ventilators for balanced ventilation (i.e. continuous mechanical supply and exhaust) and by exhaust air heat pumps for continuous exhaust-only mechanical ventilation.

Attached is a brief questionnaire which will enable us to get an idea of your company's activities in the area of residential ventilation and obtain feedback on the proposed ventilation requirement.

.....2

Please be assured that all information will remain strictly confidential. If you are interested in the results of the study, a summary will gladly be forwarded to you, once it becomes available.

If you feel there is a person in your company that is more appropriate for filling out the questionnaire, please pass it on. Once completed please return it to the address indicated at the end of the questionnaire or use the enclosed envelope.

Should you have any questions or if you require clarification to complete the questionnaire, do not hesitate to contact Allen Associates at (416) 962-6193.

Thank you very much for your co-operation.

Sincerely yours,

Jacques Rousseau
Project Manager
Project Implementation Division

Return Rate: 57%

1. **Number responses by region:**

West	3
Ontario	14
Quebec	2
Atlantic	9
Total	28

2. **How much of your residential business is ventilation related (e.g. installation of exhaust fans, heat recovery ventilators) as compared to other activities (e.g. heating and air conditioning systems)?**

SAMPLE SIZE: 28

1 to 10% ;	57 %
11 to 50% ;	29 %
51 to 100% ;	14 %

3. **With which of the following residential ventilation products are you familiar?**

SAMPLE SIZE: 28

85.5% Standard kitchen and bathroom exhaust fans

85.5% Range hood exnausters

60.5% Quiet, continuous-duty exhaust fans

85.5% Central exhaust systems (ducted from kitchen and washrooms to single exhaust fan)

71.5% Central ventilation systems (powered supply and exhaust)

75 % Make-up air ducts

57 % Make-up air fans

3. cont'd

96.5% Heat recovery ventilators

35.5% Exhaust air heat pumps

10.5% Other

4. **How do you receive information on ventilation requirements?**

SAMPLE SIZE: 28

64.5% Mailings from regulatory bodies

14.5% Comments from inspectors

92.5% Seminars/workshops

35.5% Word of mouth

39.5% Information from mechanical designer

100 % Manufacturer's literature

64.5% Sales representatives

5. **What impact will mandating defined ventilation requirements for new houses have on your company?**

SAMPLE SIZE: 27

15 % None
85 % Increased sales volume
55.5% Increased profits
0 % Decreased sales volume
0 % Decreased profits

Comments:

Concerns were mentioned regarding sufficient lead time for manufacturers (7.5%) and high demand causing poor installations (3.5%).

6. **Do you anticipate problems with availability of ventilation products if the standard is adopted nationally?**

   SAMPLE SIZE: 28

   44.5% Yes
   64.5% No
   7 % Maybe

7. **Assuming the new standard is mandated, how easily would your company be able to adapt to the anticipated increase in ventilation system installations?**

   SAMPLE SIZE: 28

   93 % Readily
   7 % With some difficulty
   0 % Very difficult